WHAT IS CLAIMED IS:

1. A battery charging system comprising:

a power supply that provides cyclic charging pulses to a battery, wherein the charging pulse has a current component and a voltage component that varies between a quiescent voltage and a maximum voltage;

a battery monitoring circuit adapted to monitor one or more of battery's parameters that respond to the charging pulses; and

a control module that adjusts the configuration of the current component of the charging pulses so as to maintain the voltage component in a range between the quiescent voltage and the maximum voltage in response to the monitored battery parameter.

2. The battery charging system of Claim 1, wherein the charging pulse is a positive pulse.

3. The battery charging system of Claim 2, wherein the current component of the charging pulse comprises a square current pulse having a first amplitude and a first width and wherein the charging cycle has a first period.

4. The battery charging system of Claim 3, wherein the first amplitude has a range of approximately 0 to 20 Coulombs/second.

5. The battery charging system of Claim 3, wherein the first width has a range of approximately 50 to 1000 milliseconds.

6. The battery charging system of Claim 3, wherein the first period has a range of approximately 100 to 2000 milliseconds.

7. The battery charging system of Claim 2, wherein the voltage component of the charging pulse depends on the current component and resistance of the battery.

8. The battery charging system of Claim 7, wherein the battery monitoring circuit monitors the quiescent voltage and the maximum voltage wherein a charging voltage is defined as the difference between the maximum voltage and the quiescent voltage and wherein the charging voltage is indicative of the battery's ability to absorb charge.

9. The battery charging system of Claim 8, wherein the control module maintains the charging voltage at a selected voltage level by adjusting the configuration of the current component of the charging pulses.

10. The battery charging system of Claim 9, wherein the selected voltage level is approximately 1 volt.

11. The battery charging system of Claim 9, wherein maintaining the charging voltage at the selected voltage level comprises maintaining the existing configuration of the current component if the monitored charging voltage is approximately equal to the selected voltage level.

12. The battery charging system of Claim 9, wherein maintaining the charging voltage at the selected voltage level comprises increasing the first amplitude of the current pulse by a selected amount if the monitored charging voltage is less than the selected voltage level.

13. The battery charging system of Claim 12, wherein the selected amount of current pulse increase is approximately 0.05 Coulomb/second.

14. The battery charging system of Claim 9, wherein maintaining the charging voltage at the selected voltage level comprises decreasing the first amplitude of the current pulse by a selected amount if the monitored charging voltage is greater than the selected voltage level.

15. The battery charging system of Claim 14, wherein the selected amount of current pulse decrease is approximately 0.05 Coulomb/second.

16. The battery charging system of Claim 1, wherein the control module further maintains the quiescent voltage at a selected quiescent voltage level by adjusting the configuration of the current component of the charging pulses wherein the quiescent voltage provides some indication of charge state of the battery.

17. The battery charging system of Claim 16, wherein the battery is a 12 volt sealed lead acid battery.

18. The battery charging system of Claim 17, wherein the selected quiescent voltage level is approximately 13.5 volts.

19. The battery charging system of Claim 16, wherein maintaining the quiescent voltage at the selected quiescent voltage level comprises maintaining the existing configuration of the current component if the monitored quiescent voltage is approximately equal to the selected quiescent voltage level.

20. The battery charging system of Claim 16, wherein maintaining the quiescent voltage at the selected quiescent voltage level comprises increasing the first width of the current pulse by a selected amount if the monitored quiescent voltage is less than the selected quiescent voltage level.

21. The battery charging system of Claim 20, wherein the selected amount of current pulse width increase is approximately 10 milliseconds.

22. The battery charging system of Claim 16, wherein maintaining the quiescent voltage at the selected quiescent voltage level comprises decreasing the first width of the current pulse by a selected amount if the monitored quiescent voltage is greater than the selected quiescent voltage level.

23. The battery charging system of Claim 22, wherein the selected amount of current pulse width decrease is approximately 10 milliseconds.

24. The battery charging system of Claim 1, wherein the current component of the charging pulse comprises a positive square charging current pulse followed by a negative square discharging pulse having a discharging pulse amplitude and a discharging pulse width wherein the discharging pulse aids the battery in charge absorption.

25. The battery charging system of Claim 24, wherein the discharging pulse amplitude has a range of approximately 20 to 200 Coulombs/second.

26. The battery charging system of Claim 24, wherein the discharging pulse width has a range of approximately 1 to 20 milliseconds.

27. The battery charging system of Claim 24, wherein the battery monitoring circuit monitors the quiescent voltage and a voltage immediately following the discharging pulse wherein a post-discharge voltage is defined as the difference between the voltage immediately following the discharging pulse and the quiescent voltage and wherein the post-discharge voltage is indicative of the effectiveness of the discharge process.

28. The battery charging system of Claim 27, wherein the control module maintains the post-discharge voltage at a selected post-discharge voltage level by adjusting the configuration of the current component of the charging pulses.

29. The battery charging system of Claim 28, wherein the selected post-discharge voltage level is approximately 0.2 volt.

30. The battery charging system of Claim 28, wherein maintaining the post-discharge voltage at the selected post-discharge voltage level comprises maintaining the existing configuration of the current component if the monitored post-discharge voltage is approximately equal to the selected post-discharge voltage level.

31. The battery charging system of Claim 28, wherein maintaining the post-discharge voltage at the selected post-discharge voltage level comprises decreasing the discharging pulse amplitude by a selected amount if the monitored post-discharge voltage is less than the selected post-discharge voltage level.

32. The battery charging system of Claim 31, wherein the selected amount of discharging pulse amplitude decrease is approximately 0.05 Coulomb/second.

33. The battery charging system of Claim 28, wherein maintaining the post-discharge voltage at the selected post-discharge voltage level comprises increasing the discharging pulse amplitude by a selected amount if the monitored post-discharge voltage is greater than the selected post-discharge voltage level.

34. The battery charging system of Claim 33, wherein the selected amount of discharging pulse amplitude increase is approximately 0.05 Coulomb/second.

35. The battery charging system of Claim 1, wherein the control module further monitors a duty cycle of the pulse charging cycle to determine state of charge of the battery wherein the duty cycle comprises a ratio of charging pulse width to the charging cycle period.

36. The battery charging system of Claim 35, wherein the duty cycle is monitored while maintaining the quiescent voltage at a specified level.

37. A method of pulse charging a battery, the method comprising:

applying cycles of charging current pulse to the battery;

monitoring voltage of the battery during selected points of each charging cycle wherein the voltage ranges from a quiescent voltage to a maximum voltage; and

adjusting the configuration of the current pulse so as to maintain the voltage in a range between the quiescent voltage and the maximum voltage in response to the monitored voltage.

38. The method of Claim 37, wherein applying cycles of charging current pulse comprises applying cycles of positive square current pulse having a first amplitude and a first width and wherein the charging cycle has a first period.

39. The method of Claim 38, wherein the first amplitude has a range of approximately 0 to 20 Coulombs/second.

40. The method of Claim 38, wherein the first width has a range of approximately 50 to 1000 milliseconds.

41. The method of Claim 38, wherein the first period has a range of approximately 100 to 2000 milliseconds.

42. The method of Claim 37, wherein monitoring voltage of the battery comprises monitoring the quiescent voltage and the maximum voltage wherein a charging voltage is defined as the difference between the maximum voltage and the quiescent voltage.

43. The method of Claim 42, wherein maintaining the voltage comprises maintaining the charging voltage at a selected voltage level.

44. The method of Claim 43, wherein the selected voltage level is approximately 1 volt.

45. The method of Claim 42, wherein maintaining the voltage comprises maintaining the quiescent voltage at a selected quiescent voltage level.

46. The method of Claim 45, wherein the selected quiescent voltage level is approximately 13.5 volts for a 12 volt battery.

47. The method of Claim 37, wherein adjusting the configuration of the current pulse comprises increasing the first amplitude of the current pulse if the monitored charging voltage is less than the selected voltage level.

48. The method of Claim 47, wherein the first amplitude is increased by approximately 0.05 Coulomb/second.

49. The method of Claim 37, wherein adjusting the configuration of the current pulse comprises decreasing the first amplitude of the current pulse if the monitored charging voltage is greater than the selected voltage level.

50. The method of Claim 49, wherein the first amplitude is decreased by approximately 0.05 Coulomb/second.

51. The method of Claim 37, wherein adjusting the configuration of the current pulse comprises increasing the first width of the current pulse if the monitored quiescent voltage is less than the selected quiescent voltage level.

52. The method of Claim 51, wherein the first width is increased by approximately 10 milliseconds.

53. The method of Claim 37, wherein adjusting the configuration of the current pulse comprises decreasing the first width of the current pulse if the monitored quiescent voltage is greater than the selected quiescent voltage level.

54. The method of Claim 53, wherein the first width is decreased by approximately 10 milliseconds.

55. The method of Claim 37, wherein applying cycles of charging current pulse comprises applying cycles of a positive square charging pulse followed by a negative square discharging pulse wherein the discharging pulse has a discharging pulse amplitude and a discharging pulse width.

56. The method of Claim 55, wherein the discharging pulse amplitude has a range of approximately 20 to 200 Coulombs/second.

57. The method of Claim 55, wherein the discharging pulse width has a range of approximately 1 to 20 milliseconds.

58. The method of Claim 55, wherein monitoring voltage of the battery comprises monitoring the quiescent voltage and a voltage immediately following the discharging pulse wherein a post-discharge voltage is defined as the difference between the voltage immediately following the discharging pulse and the quiescent voltage.

59. The method of Claim 58, wherein maintaining the voltage comprises maintaining the post-discharge voltage at a selected post-discharge voltage level.

60. The method of Claim 59, wherein the selected post-discharge voltage level is approximately 0.2 volt.

61. The method of Claim 55, wherein adjusting the configuration of the current pulse comprises decreasing the discharging pulse amplitude if the monitored post-discharge voltage is less than the selected post-discharge voltage level.

62. The method of Claim 61, wherein the discharging pulse amplitude is decreased by approximately 0.05 Coulomb/second.

63. The method of Claim 55, wherein adjusting the configuration of the current pulse comprises increasing the discharging pulse amplitude if the monitored post-discharge voltage is greater than the selected post-discharge voltage level.

64. The method of Claim 63, wherein the discharging pulse amplitude is increased by approximately 0.05 Coulomb/second.

65. The method of Claim 37, wherein adjusting the configuration of the current pulse results in change in duty cycle of the charging pulse wherein the duty cycle comprises a ratio between the width of the charging pulse to the period of the cycle.

66. The method of Claim 65, wherein the duty cycle is monitored wherein the duty cycle is a good indicator of state of charge for a wide variety of batteries and wherein the duty cycle is generally independent of the type of battery.